tribution à l'étude des anneaux de Saturne," and the following is a translation from *La Nature* of the complimentary terms in which M. DARBOUX addressed the gifted authoress in granting her the degree: "You have occupied yourself with one of the most interesting questions in astronomy. The great names of GALILEO, HUYGHENS, CASSINI and LAPLACE, without speaking of those of my illustrious colleagues and friends, are connected with the history of each of the great advances in the attractive but difficult theory of the rings of Saturn. Your work is not a slight contribution to the subject, and it places you in an honorable position among the ladies who have devoted themselves to the study of mathematics. During the last century Mlle. MARIE AGNESI gave us a work on the differential and integral calculus. Since then SOPHIA GERMAIN, as remarkable for her literary and philosophic talent as for her mathematical faculties, was held in esteem by the great geometers who honored our country at the beginning of this century. And but a few years ago the Academy of Sciences, on the report of a commission in which I had the honor to take part, awarded one of its best prizes to Mme. KOWALEWSKA, placing her name by the side of those of EULER and LAGRANGE in the history of discoveries relating to the theory of the movement of a solid body around a fixed point. In your turn you have entered upon your career. We know that for some years you have devoted yourself with great zeal and success to investigations connected with the star chart. Your thesis, which you have prepared according to our course of higher mathematics, with an assiduity that we could not ignore, is the first that a lady has presented and successfully sustained before our faculty to obtain the degree of Doctor of Mathematical Sciences. You have worked in a deserving manner, and the faculty has unanimously decided to declare you worthy of the grade of Doctor."—From *Nature* for December 28, 1893.

PHOTOGRAPHIC MAP OF THE NORMAL SOLAR SPECTRUM [MADE BY PROFESSOR H. A. ROWLAND].

"This series of photographs of the solar spectrum has been made in the Physical Laboratory of the JOHNS HOPKINS University. Several concave gratings, of 6 inches diameter and 21½ feet radius, having 10,000 or 20,000 lines to the inch, were used for the purpose. The process of making this map is the well-

known ROWLAND method, and is based on the property of the concave grating as discovered by Professor ROWLAND: this property is that the spectrum, as photographed in any given order, is normal and of the same scale throughout. The focus remains automatically adjusted so that one has only to move the instrument to the part of the spectrum required, absorb the overlying spectra and put in the photographic plate. The negatives enlarged have been selected from many hundreds taken from different gratings, though three gratings were finally selected for the work. The negatives from any given order of spectrum are measured from one standard line to another on a dividing engine, so that the constant of the dividing engine is known. The scale is made by ruling on a piece of French plate glass having a coating of blackened collodio-chloride. The negatives are then clamped to the scale firmly, after being adjusted into position by the standards. They are next put in the enlarging apparatus; and the whole is enlarged from 2½ to possibly 4 times, so as to make the scale of the map about 3 times that of ANGSTRÖM'S map. The positives thus made are then figured, and negatives are made from them by contact.

"In the negatives so far examined the scale has been placed within less than $\frac{1}{10}$ ANGSTRÖM division or $\frac{1}{100000}$ wave-length of its true position.

"As to the definition of the spectra, much is lost in the enlargement, not from want of definition in the enlarging lens, a 25 x 21 inch DALLMEYER rapid rectilinear, but from the radical defect of photographic processes: for when one brings out the fine doubles in which the streak of light in the centre is very faint, he loses many of the fainter lines. The original negatives show E, and even finer lines like those at wave-lengths 5276.1 and 5914.3 plainly double; but there is little hope of showing this on the map. The atmospheric line just outside of one of the D lines also nearly merges into it, although in the original negative it is widely sundered from it.

"As to comparison with other maps of the spectrum made by measurement and drawing, it may be said that no comparison is possible. The photograph is the work of the sunlight itself, and the user of this map has the solar spectrum itself before him, and not a distorted drawing full of errors of wave-length and of in-

tensity. The superiority is so great that there is no possibility for comparison.

"The following is a list of the plates:

a	from	wave-length	3000	to	3330	f	from	wave-length	4850 to 5350
b	"	"	3270	to	3730	g	"	"	5250 to 5750
c	"	"	3670	to	4130	h	"	"	5650 to 6150
d	"	"	4050	to	4550	i	"	"	6050 to 6550
e	"	"	4450	to	4950	j	"	"	6450 to 6950

"The plates will be delivered in Baltimore or New York or will be sent by express or mail, securely packed, at the charge and risk of the purchaser, at the following *net* prices: Set of ten plates, wave-length 3000 to 6950, $20.00; single plates, $2.50. Should any extra plates continuing the spectrum in either direction be published, subscribers can have them at $2.00 each.

EXTRA PLATES.

"Two plates have been made of the B and D lines. The latter are 3 inches apart, and the former has an extent of about 24 inches. Two enlargements of some of the carbon bands from the arc electric light have also been made. They show the wonderful structure of these bands, each containing many hundred lines, each one of which is a close double or, in some cases, a triple. These plates will be sold for $2.25 each, unmounted, or for $2.50 mounted on cloth."

Orders should be addressed to The Johns Hopkins Press, Baltimore, Maryland, U. S. A.

PHOTOGRAPHING THE CORONA.

The *Observatory* for December credits Professor GEORGE E. HALE of Chicago with the statement that the attempt to photograph the corona without an eclipse, which was made on Pike's Peak last summer without success, will be continued this summer on Mount Etna with the assistance of Professor TACCHINI. The unsuccessful results on Pike's Peak were attributed to the impurities in the atmosphere at that time. It is expected that the blue Italian sky will be more favorable. W. W. C.